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EDFN 601: Applied Statistics and Design
Western Kentucky University
Summer 2015

General information

Instructor: Kimberlee Everson, Ph.D.
Office: Gary Ransdell Hall 3082
Office hours: By appointment
Email: kimberlee.everson@wku.edu
Phone: 270-745-2115

Catalog Description

Parametric and non-parametric statistical techniques applied to experimental and quasi-experimental research designs in education.

Course Objectives

Upon completion of this course, students will be able to:

- Design statistical studies effectively.
- Analyze primary and secondary datasets using appropriate intermediate statistical techniques.
- Interpret statistical results correctly.
- Manage data in SPSS effectively.

Prerequisite Courses

EDFN 501 (Educational Statistics) or equivalent or instructor permission.

Course Overview and Philosophy

This course will focus on intermediate statistical methodologies (e.g., multiple linear regression, ANOVA-based techniques, logistic regression, nonparametric statistics) that may be useful to you in conducting research either as part of a dissertation study or in your role as an educational or organizational leader. The intent is that, by the end of the course, you will know enough about each of these methodologies that you will not only know when each is appropriately used but also be capable of learning more about the topic, with the help of appropriate resources or methodological advisors, in order to conduct your own research. Hopefully, this course will open your eyes as to what can be done as well as to what you might most feel capable of undertaking.

Class Sessions

We will meet four Fridays (5-8 pm) and two Saturdays (8 am – 5 pm) in GRH 1089. The dates of class are: 5/22, 5/23, 6/5, 6/19, 7/10, 7/11. You will need access to a laptop computer with software downloaded (see below) for each class session.

Required Texts

The following texts are required. They are available through the bookstore.

Pelham, B.W. (2013). *Intermediate Statistics: A Conceptual Course*. Thousand Oaks, CA: SAGE. ISBN 978-1-4129-9498-9

Schroeder, L.D., Sjoquist, D.L., & Stephan, P.E. (1986). *Understanding Regression Analysis: An Introductory Guide*. Newberry Park, CA: SAGE. ISBN 0-8039-2758-4. (This book is easy to find used at online booksellers as well.)

Optional Texts: Some of these texts are more mathematically more intensive, but helpful if you want to understand more about underlying theory. Others are good references for software packages we will use, but are not required (unless you wish).

Leech, Nancy L. (2011). IBM Statistics for Intermediate Statistics: Use and Interpretation. This text gives more detail than Pelham about the use of SPSS.

Norpoth, H., & Iversen, G.R. (1987). Analysis of Variance. Newberry Park, CA: SAGE. ISBN 0-8039-3001-1. (This book is easy to find used at online booksellers as well.). This text gives you the interesting mathematics behind ANOVA-based techniques. It is not an "applied" book.

Luke, D. A. (2004). Multilevel Modeling. Thousand Oaks, CA: SAGE. ISBN 978-0-7619-2879-9. (This book is easy to find used at online booksellers as well.) This book outlines the general concepts and theory but no real applied examples using software we will use. It is fairly cheap.

Rabe-Hesketh, S. and Skrondal, A. (2008, 2nd edition OR 2012 3rd edition, Vol 1 only). Multilevel and Longitudinal Modeling Using Stata. College Station, TX: Stata Press. (Cheapest directly from Stata at http://www.stata.com/bookstore/multilevel-longitudinal-modeling-stata/index.html). This text is a very thorough applied text regarding HLM in Stata)

Acock, A.C. (2014). A Gentle Introduction to Stata. College Station, TX: Stata Press. (Cheapest directly from Stata at: http://www.stata.com/bookstore/gentle-introduction-to-stata/index.html). This is a good overall "how to use Stata" book that covers most of what we will do in the course.)

Required Software

You should have a copy of SPSS version 19.0 or higher installed on your own computer. SPSS software is available for students to lease (free for WKU faculty and staff) from the WKU software center (www.wku.edu/it/sms/) or from estore.onthehub.com ($59.99 for 6 months or you can lease for longer). SPSS standard Grad Pack (NOT just base) is recommended. Even though SPSS is available in most labs on campus (e.g., EdTech classrooms and MMTH labs), you will need to use this software to complete course assignments off campus. **Please come to the first class with SPSS already installed on your computer.**

In addition to SPSS, you will need to install a version of Stata on your computer. You can install ANY of the options given here: http://www.stata.com/order/new/edu/gradplans/student-pricing/ ($38+). If you do not expect to do HLM on your dissertation or similar future research, and you don't intend to take other advanced stats courses with me, then the $38 version (Small Stata 6 month license) will work for this class. Otherwise, I recommend Stata/IC for as long as you expect to use it. You are welcome to email me to discuss the best option for your situation.

Some SPSS vs Stata information:

- SPSS can do fairly well everything we do in this class, except Hierarchical Linear Modeling.
- SPSS is a little easier to use than Stata, and most education faculty at WKU do not know how to use Stata. They will likely expect you to use SPSS for any research you do with them or that requires their help, including your dissertation. Learning SPSS is a requirement of the doctoral program coursework. Also, Stata is not available in the WKU open computer labs.
- As far as I know, the required classes involving quantitative methods at WKU, including ELDL 732, all expect you to use SPSS.
- Stata can do everything SPSS can, and more, and is a little cheaper. Stata is used more often than SPSS in business fields, economics, etc. For some of you, that may be more appropriate. Once you get the hang of Stata, you might actually prefer it.
- I will teach you both Stata and SPSS in this class. It only helps you to learn more tools (and makes you more marketable).

Class Sessions

You are required to attend and participate in all class sessions. If there is a verifiable medical emergency that prevents attendance, it is your responsibility to arrange for another student to take notes and/or videotape the class session for you. Please be aware that class sessions are working sessions (predominantly "lab" style). Thus, you are expected to have access to a laptop with SPSS and Stata installed. You are also expected to have completed all readings and homework assignments before class as this material will not necessarily be fully re-taught in the form of lecture. Questions from the readings and homework, however, will be addressed and the critical points of understanding may be reviewed in lecture.

Blackboard

All homework assignments will be available in Blackboard. There are four units of study corresponding to the four weekends of class and a review unit. The regular units of study will include readings, a study journal, and a quiz (due before class addressing that unit). In addition, each unit includes a project to be completed immediately after the class session addressing that unit. The review unit is intended to review a few basic statistical procedures that you may have forgotten since you took introductory statistics (a prerequisite). There will

be a review unit test.

Grading

Study Journal	100 points
4 Unit Quizzes (50 each)	200 points
3 Unit Projects (50 each)	150 points
Final Project	150 points
Total	600 points

Standard grading scale: 100%-90% - A; 89%-80% - B; 79%-70% - C; 69%-60% - D; 59%-0% - F

Description of Major Assignments

Study Journal

The study journal entries will require you to respond to homework given in your textbook during the semester. The response journal will be graded once, at the end of the semester, but you are required to make the entries as required after each class session. The study journal will be graded as follows:

Criteria	Points
Timely: Journal entries are made during the timeframe assigned (not late).	0-20 points
Substantive: Journal entries are meaningful and non-trivial.	0-20 points
Reflect Reading: Responses made in the journal suggest careful and thoughtful reading of assigned texts.	0-20 points
Expression: Writing is clear, well-organized, and free from grammar or spelling errors.	0-20 points
Correct: Entries give correct and complete answers to the questions posed in the text.	0-20 points

Reading Quizzes

Online quizzes will be given for each unit and must be taken before the beginning of the Friday class session in which we discuss each unit. While quizzes will be open book, they will be timed (60 minutes) in order to encourage you to study before you take the quiz. You will be allowed to take the quiz twice, if you wish, and you will earn the average of the two attempts as your score.

Unit Projects

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After each weekend in which we hold class, you will be assigned a project to complete based on the material covered that weekend. The projects will be hands-on, real data analyses and require the use of SPSS and Stata. These projects are not tests. In other words, you are allowed to get assistance from me or others, provided the final work is completed by you independently. In other words, others can advise you but they cannot do the analysis for you.

Final Project

At the end of Unit 4, instead of the regular unit project, you will be required to complete a larger project. ***You will have a choice of several topic areas for your project and additional readings may be assigned relevant to your topic choice.*** This project will require you to create an approximately 2000 word research summary/proposal, as is often submitted to educational research conferences. In addition, you will create the electronic file for a poster as presented at conferences (I won't make you print it as that is expensive). You will be supported in submitting your project to AERA, MSERA, or a similar conference, if desired. However, this submission will not be required to get a good grade in this class. You will also be encouraged to submit your poster to CEBS REACH week next spring, but again, this is not required to get a good grade in this class.

Late Assignments - Late assignments will NOT be accepted ***unless*** a doctor's note or similar evidence of a verifiable emergency is submitted.

Make up policy – Note the quizzes will NOT be made up without written documentation of a medical emergency or other excused university absence.

Study Groups – Peers can often be an excellent resource when reviewing concepts, especially with complex material. Students will work in teams for class exercises to facilitate understanding of the material presented in readings. Students are encouraged to review course material weekly with their peers outside the class and to study for quizzes in teams to facilitate understanding.

Plagiarism (Important)

It is expected that each student will do his/her own work. Academic dishonesty, including any form of plagiarism or cheating will not be tolerated. Be advised that student work may be checked using plagiarism detecting software. Our department (EALR) requires the following:

Before receiving a grade in this course students will be REQUIRED to verify in writing (send me an email certifying compliance) that they have completed the Harvard Graduate School of Education online tutorial: Principles of Paraphrasing: How to Avoid Plagiarism in Three Easy Modules:

http://isites.harvard.edu/icb/icb.do?keyword=paraphrasing

Or, Indiana University's Plagiarism and Academic Integrity tutorial:

https://www.indiana.edu/~istd/

Student Policies:

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The following sections are taken from the 15th Edition of WKU's Faculty Handbook:

Plagiarism:
To represent ideas or interpretations taken from another source as one's own is plagiarism. Plagiarism is a serious offense. The academic work of a student must be his or her own. One must give the author(s) credit for any source material used. To lift content directly from a source without giving credit is a flagrant act. To present a borrowed passage after having changed a few words, even if the source is referenced, is also plagiarism.

Cheating:
No student shall receive or give assistance not authorized by the instructor in taking an examination or in the preparation of an essay, laboratory report, problem assignment, or other project, which is submitted for purposes of grade determination.
Disposition of Offenses:
Students who commit any act of academic dishonesty may receive from the instructor a failing grade in that portion of the course work in which the act is detected or a failing grade in the course without possibility of withdrawal. The faculty member may also present the case to the University Disciplinary Committee through the Office of the Dean of Student Life for disciplinary sanctions. A student who believes a faculty member has dealt unfairly with him/her in a course involving academic dishonesty may seek relief through the Student Complaint Procedure.

Other Types of Academic Dishonesty:
Other types of academic offenses, such as the theft or sale of tests, should be reported to the Office of the Dean of Student Life for disciplinary action.

Accommodation of Disabilities:
Students with disabilities who require accommodations (academic adjustments and/or auxiliary aids or services) for this course must contact the Office for Student Disability Services, Room 445, Potter Hall. The OFSDS telephone number is (270) 745-5004 V/TDD. Please DO NOT request accommodations directly from the professor or instructor without a letter of accommodation from the Office for Student Disability Services.

Affirmative Action:
Western Kentucky University does not discriminate on the basis of race, sex, religion, color, national or ethnic origin, age, disability, sexual orientation or military service. Inquiries or comments regarding these issues should be directed to the Director of Equal Opportunity/504/ADA Compliance, Western Kentucky University, 1906 College Heights Blvd., Bowling Green, KY 42101, Telephone (270) 745-5121, TTY (270) 745-3030.

Extra Help:
The instructor will be available as need is indicated. Students are encouraged to discuss any questions or problems with the instructor.

Course Adjustments:

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The instructor reserves the right to modify the course requirements, schedule, and syllabus. The syllabus and schedule for this course are subject to change in the event of extenuating circumstances. No change will occur, however, *unless* proper and prior notice is given to students.

Date Prepared and by Whom:
Course syllabus prepared January 6, 2015 by Kimberlee Everson

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Course Timetable

Topic	Readings, and Quiz Due	Meeting Dates	Homework Journal Due	Project Due
Unit 1: ANOVA-Based Methods	5/22 at 5 PM	5/22, 5/23	5/30 Midnight	5/30 Midnight
Unit 2: Multiple Regression (Part 1)	6/5 at 5 PM	6/5	6/13 Midnight	6/13 Midnight
Unit 3: Multiple Regression (Part 2)	6/19 at 5 PM	6/19	6/27 Midnight	6/27 Midnight
Unit 4: Advanced Methods (HLM, logistic regression, other topics)	7/10 at 5 PM	7/10, 7/11	NONE	8/12* Midnight

*Please note that I will be mostly unavailable (on a cruise ship) approximately July 21 – August 4. While I will generally get emails during that time, there may be a longer than usual delay in my responses and I will not be able to meet in person. Plan to work on your project before that period of time and/or after, so that I can best respond to your questions. I have made the project deadline in mid-August in order to give flexibility for you around my vacation.